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Pinewood Studios, the Independent Frame, and Innovation

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British director Darrel Catling reported to the British trade press in February 1948 on the Independent Frame (IF), a new system of film production that had been launched at Pinewood Studios. Catling had recently used it to make *Under the Frozen Falls*, a short children's film that had benefited from the IF's aim to "rationalize that which is largely irrational in film making."¹ He described how his film had been very carefully pre-planned in terms of script, storyboards, and technical plans. Several scenes were pre-staged and filmed without the main cast who were later incorporated into scenes by means of rear projection. Special effects were of paramount importance in reducing the number of sets that needed to be built. Process work included hanging miniatures, glass shots, matte shots, and foreground transparencies. Sets were built on wheeled rostrums so that studio floors were never idle as one set replaced another, more or less instantaneously. These were the essential features of IF filmmaking which aimed to reduce the time normally taken for a production while also reducing costs. The IF received extensive commentary in the trade press over the next two years, as several feature films were released which applied its techniques and philosophy of efficiency, planning, and integrated design. Heralded as a revolutionary approach, the IF promised to streamline British production methods and halt a series of serious economic crises that had beset the film industry following the end of the Second World War. While most of its key components were already in existence or had been mooted, such as "the pictured script" and a number of special effects involving projection, it represented a turn towards more mechanized and cost-effective methods for their deployment.²

Yet despite the excitement that accompanied its development and initial application, the IF has largely been recorded in film histories as a failure. Despite enthusiastic endorsement from Michael Powell, who as early as 1945 advocated it as a "revolution...a big

step forward” with “consequences as far-reaching as the introduction of colour and sound,” the IF was never applied to the production of more than a handful of British films in the late 1940s.³ Most histories consider it as a bold experiment that failed for a number of reasons including bad timing, criticism from technicians, uneven application, and films that were seen as unremarkable.⁴ This chapter reconsiders the IF’s history, focusing on its origins, application, the debates it prompted, and its legacy for Pinewood Studios. I argue that even though in the short-term it did not transform production, in retrospect the IF was much more than an expensive gamble by J. Arthur Rank, Britain’s dominant film producer who bankrolled its development. Rather, the IF was an innovative response to the problems facing the British film industry at the end of the 1940s. It also helped to change Pinewood, both physically and in its production practices, contributing to its evolution into the effects hub it is renowned for today; it is thus a key part of Pinewood’s history.

The IF was devised by David Rawnsley, a British set designer with an engineering background who had worked with David Lean, Michael Powell and Emeric Pressburger. While the IF was presented to the trade as a new system, it orchestrated a number of existing technical developments. During the Second World War, disruptions to studio activity and a scarcity of labor and materials meant that cost-cutting efficiencies spawned creative invention. Rawnsley had become concerned about “the crowded stages, the interminable delays, the chopping and the changing, the noise and the confusion, and the other uneconomic aspects” of studio film production.⁵ As art director on *In Which We Serve* (David Lean, Noël Coward, 1942), he devised many ingenious effects to convey stormy seas by means of a rocking process screen. Michael Powell’s admiration for Rawnsley’s work followed their collaboration on *49th Parallel* (Michael Powell, 1941) and *One of Our Aircraft is Missing* (Michael Powell and Emeric Pressburger, 1942). Powell recalled how Rawnsley and production manager Syd Streeter:

practically single-handed, built the submarine for *49th Parallel*. And, when we had to make *One of Our Aircraft is Missing* with John Corfield on a shoestring, and we had to take six actors across Holland and back to England...there must have been about forty sets of which at least half were on-the-spot improvisations, effects of light and shade, cooked up by Ronnie Neame and David and me, and not only perfectly satisfying to the public – it was a damn sight more satisfying to us.⁶

Powell made an important point that influenced his subsequent approach to production design: “Realism is one thing and naturalism another. I hate naturalism. I hate it when we have a simulated exterior scene in the studio, and I see prop men bringing in great branches of living trees, covered with leaves, which wither under the light and are thrown out the next day.”⁷ This philosophy was implied with the IF, a point recognized by Dixon who acknowledges that simplified sets had the potential for stylization via emphasis on shadows and props that could become “part of an overall system of imagistic substitution.”⁸ As we shall see, a few of the films made with the IF on occasion showed such artistry. Macnab even goes so far as to argue that “in a sense the IF prefigures the ‘total cinema’ Powell sought to achieve” with productions such as *The Red Shoes* (1948) and *The Tales of Hoffmann* (1951).⁹ These shared the IF’s emphasis on preparatory drawings, pre-planning, and the creation of a total, immersive world within a film studio.

The prevailing ethos of the IF was to place emphasis on the production team whose efficiency was crucial for its success. As such it was anti-auteur in its promotion of the contributions of technicians, special effects experts and set designers such as Rawnsley who enjoyed the challenges of lower budget, independent filmmaking. Rawnsley had learned the benefits of detailed pre-planning when he designed the sets for *They Were Sisters* (Arthur Crabtree, 1945). Claiming to have influenced Rawnsley, producer Harold Huth recalled how on this film he perfected “a scheme of pre-planning every shot in a picture” by using charts

which recorded camera movements, the movements of the actors, models and storyboards.”¹⁰ These were incorporated into the philosophy of the IF which was also an intricate set of technical instructions designed to work in concert and with precision to achieve the most effective results. Sets, properties and perspectives were built as a unit. They could be transported as a unit, used, and re-used, in very little time. As Catling observed: “The system establishes a *set of rules* for the game of picture making – where previously no holds were barred; and if the system is to work, people must abide by the rules, and that’s where the team spirit comes into play.”¹¹ The *Kinematograph Weekly* described the IF as a challenge to producers and directors to adjust their practices to “factory conditions of film making; they must learn to co-ordinate their ideas with the technical methods offered by their heads of departments.”¹² Essentially, it was “a system of pre-production planning – with a difference,” in which effects, or “tricks of the trade” were utilized to the full to speed up production and reduce costs. This meant deploying back projection, process shots, miniatures, and glass shots into a precise scheme of pre-production planning. Detailed storyboards informed the planning phase as well as location shooting using extras instead of principal actors.¹³ These scenes would appear in the finished film, followed by interior scenes featuring the main stars, thus cutting costs on engaging major players for location filming. Techniques such as back projection, which had been used for decades in British studios, became central to IF productions. In addition, Rawnsley is credited as having devised new equipment including hexagonal rotating stages; ingenious back projection tunnels and direction booths set high above the studio floor; combined screen holders and light rails; mobile rostrums and projection towers [Figs 1-3].¹⁴

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The first production to use the IF was Catling's *Under the Frozen Falls* (Children's Entertainment film and Gaumont-British Instructional, release date March 1948). Rawnsley left the Rank Organization's research department at the end of 1947 and established Aquila Films with Donald Wilson.¹⁵ The IF was then applied by Aquila and Gainsborough for the following feature films: *Warning to Wantons* (Donald Wilson, Aquila Films, February 1949); *Floodtide* (Frederick Wilson, Aquila Films, May 1949); *Stop Press Girl* (Michael Barry, Aquila Films, July 1949); *Poet's Pub* (Frederick Wilson, Aquila Films, August 1949); *Boys in Brown* (Montgomery Tully, Gainsborough Pictures, December 1949), and *The Astonished Heart* (Terence Fisher and Antony Darnborough, Gainsborough Productions, Sydney Box Productions, March 1950). All of the films were produced at Pinewood.¹⁶ Rawnsley continued to develop ideas related to the IF and is credited as being an IF/technical consultant on *Under the Frozen Falls*, *Warning to Wantons*, *Stop Press Girl*, and *Floodtide*.¹⁷

Before considering the IF and its application in more detail, it is important to outline the prevailing economic and political contexts for its introduction. These shaped its evolution, short-term impact, and reception by the film trade. The post-war years were extremely difficult for the British film industry when it faced fierce competition from Hollywood's films, which had historically dominated the domestic market. After 1945, Hollywood was keener than ever to export films to Europe and was determined to dismantle protective quotas, such as those enforced since 1927 to protect the British film industry. The British economy was handicapped by a shortage of dollars, particularly the large amount remitted to America in respect of popular films shown in British cinemas. Film thus became an integral aspect of Britain's acute post-war balance of payments problems. A crisis came to a head in August 1947 when a 75% "ad valorem" duty was imposed on foreign films.¹⁸ As a retaliatory measure, Hollywood producers boycotted the British market for just over six months. In the absence of the American films that exhibitors relied upon to make profits, the British film

industry made a valiant attempt to produce more feature films. But the boycott exposed the fragility of the film industry on many levels, not least conflicts between the production and exhibition sectors. A deal was struck in March 1948 when the duty was removed in exchange for a blocking arrangement whereby American companies could remit up to \$17 million a year, plus a sum equal to the dollar earnings of British films in the USA. The intention was to encourage the use of blocked earnings from American films to finance productions in Britain. To encourage British production in June 1948 the British government increased the statutory quota to 45% of British first feature films to be shown by exhibitors; the quota for the supporting program was lower at 25%.¹⁹ In October 1948 the National Film Finance Corporation was established to loan Treasury funds to producers via a distribution company, British Lion.

The immediate background to the launch of the IF then was inextricably bound up with these larger issues of the British government's film policy and also of Anglo-American film relations. The ability of British producers to supply cinemas with good quality films was at the heart of debates about available studio space, budgets, production methods, and how to turn out the best films in relatively quick succession. The American boycott created an opportunity for British films but the re-entry of American films in March 1948 once again subjected them to severe competition, and this time from an industry determined to make good the lost months of overseas profits. It seems that during the key years of 1948 and 1949 British production held up better than might have been expected but profits were falling, particularly for the Rank Organization that provided research and development funds for the IF. Much was at stake for Rank, as owner of half of the total number of British studios, including the largest, Denham and Pinewood. In 1947 Rank reported severe production losses and in 1948 a high bank overdraft and investments in uncompleted films.²⁰ Producers were thus challenged to turn the crisis around by revolutionizing studio methods and technical

infrastructure. The 45% quota placed even more onus on them to deliver a greater number of profitable films, as noted in a contemporary production survey:

The whole problem of making films in all the studios *at the right price* must be solved at once. Reissues can only keep kinemas going for a few months at the most, and, if the full quota is to be met later in 1949 British studios will have to be making at the minimum 100 *first* features a year. And the maximum which can be made on available stage space (unless we revive the 'quickie') is 120. This can only be done with all the studios working all the time.²¹

This judgment was based on the fact that British studios wholly completed 63 first features in 1948 and 59 in 1947, figures considerably lower than 100.²²

A survey of the output of the major studios gives a sense of Pinewood's capacity at this time. For most of the Second World War Pinewood was requisitioned for propaganda filmmaking by the Army Film and Photographic Unit, the RAF Film Unit and the Crown Film Unit. After the war the studio was once again active for commercial filmmaking, and production increased. Rank's films cost less from 1948 and the average shooting schedule for first features was reduced. These conditions were conducive for the introduction of the IF, with its emphasis on economy, time management, and efficient use of studio space. Yet the industry's instability was signaled when unions became worried by closures of studio space in 1948, with dismissals reported at Denham and Ealing, British National, and smaller studios. Gainsborough Studios were closed in 1950, and Rank was keen to concentrate production and technical innovation at Pinewood.

While the IF promised in the longer term to increase production, in the shorter term it felt threatening to some technicians who feared that its cost-cutting rationale might result in lay-offs of studio labor. The aim of continuous production proved to be impossible even though production of first features rose slightly to 66 films in 1949 and the number of films

produced by independents increased.²³ Despite Rank's continuing financial difficulties, Pinewood completed nine first feature films in 1949, and Denham was responsible for ten. It should be noted that the majority of films made using the IF were filmed and released in 1948-49, placing emphasis on the role of the process in production activity during this crucial period. Indeed, the annual trade publication *The Kinematograph Year Book* took the opportunity to assess its record, while noting that it was "intimately associated with the problem of production costs."²⁴ The arguments for and against the IF were neatly summarized: "It enables production costs to be reduced by a quarter, with no sacrifice of entertainment value. Against this, it is urged that it restricts the work of director and artistes and detracts from the realism which can be secured only by the use of genuine location photography and unfettered studio work."²⁵

The technical innovations associated with the IF were widely praised, particularly the development of still and moving background projectors by British Acoustic. In addition, mobile lighting rails to carry lamps and crew were constructed by Vickers-Armstrong. Lighting set-ups were typically indirect: "An ingenious reflector system is employed which dispenses with light rails and reduces the candlepower of the normally lighted set by almost two-thirds."²⁶ Sets built on mobile rostrums could be moved through pre-production and production departments [Fig 3]. Some reconstruction had been necessary in Pinewood including the erection of twin stages, each 200x175ft in area, with a collapsible insulated partition between them. The principle of the assembly line is evident in the rational, spatial flow for the organization of materials, construction stores, and the assembly bay where sets were mounted on the mobile rostrums. A "waiting bay" next to the stage held the sets until required when they would be flown into position by an overhead gantry. A similar approach had been applied in Hollywood when Fred Pelton, MGM's studio manager, used mobile sets. But they were too large and unwieldy to be fully effective, which convinced Rawnsley that

the IF would work best with smaller mobile sets and rostrums. He also studied Disney's planning methods and was inspired by how the British Broadcasting Corporation's (BBC) technicians were effective in spite of working in cramped conditions at Alexandra Palace.²⁷

[5_Street_Fig4 here]

The IF was exploited at a time when other significant technical innovations were introduced to British studios, thus associating it with a wider culture of contemporary experimentation. This included Ealing's introduction of the Spelleroller, a device that could jack up and move with ease heavy pieces of scenery. Studio lighting equipment was also progressing in terms of compact-source lamps and the renowned 225-amp arc lamp produced by Mole-Richardson known as "The Brute." Other innovations included Venetian-type shutters with remote control which enabled sets to be dimmed with great sensitivity and precision.²⁸ Pinewood producer Donald Wilson reported in April 1949 that the first films to be made using the IF had been largely successful in demonstrating several of its key features including the evocation of opulence for very little cost in *Warning to Wantons*, and in *Floodtide* conveying the signature of "authenticity in the production of a particular place – Glasgow and Clydeside – with large canvas, brought to the studio."²⁹ Other studios were urged to follow these principles, and towards the end of 1948 plans were publicized for the IF to be used at Ealing and Denham.³⁰

The spin-off effect of the IF was notable as minds were concentrated on time-saving in set construction and pre-planning. Terence Verity, an art director working for Associated British, devised a turntable technique to enable a set to be turned to face the end of the stage with the backings/backdrop. This saved shooting time and set construction, enabling continuous shooting for *The Hasty Heart* (Vincent Sherman, 1949), filmed at Elstree.³¹ Kenneth K. Rick, second unit director on *The Gorbals Story* (David MacKane, 1950), considered how the IF might benefit studios smaller than Pinewood or Denham. He estimated

that the film's twenty-day shooting time could have been reduced if a form of the IF had been applied in Merton Park studio. In particular, he drew attention to time-saving devices such as rolling rostrum set construction, back projection still plates using a Stereopticon and detailed shooting plans.³² David Rawnsley kept his name in profile as a technical innovator with expositions of a new light reflector system to provide greater control of light and shadow.³³

A consistent feature of the debates surrounding the IF was the need to reduce the high costs of film production. This imperative informed the establishment of a committee chaired by Lord Gater at the end of 1948 on Film Production Costs. The inadequacy of planning methods in British studios informed its unsurprising conclusions.³⁴ The IF can be read as a response to the idea that more films should be produced, faster and for less money. To some extent this was at odds with the desire, also prevalent in the post-war period, for quality, prestige films to conquer overseas markets, particularly the USA. Yet data published on the subject gave ambiguous results. While it was proven that cheaper, ingeniously made films such as Gainsborough's *The Wicked Lady* (Leslie Arliss, 1945) could make huge box-office profits, the trick was to systematize this as the *modus operandi* of British cinema. *In Which We Serve*, the film that gave Rawnsley his first opportunity to try out some of his innovative technical methods, cost a respectable £240,000. It did very well at the UK box-office and also in America.³⁵ The debate questioned the idea that "high quality" production values, deemed to be necessary to impress foreign critics and audiences, should necessarily be equated with how much a film cost to produce. The inflation of production costs was much-publicized in the late 1940s, with high-budget films such as Rank's *Bonnie Prince Charlie* (Anthony Kimmins, 1948) costing £760,000 but recouping only £94,327 by April 1950.³⁶ Better records were attained by "prestige" films including *Hamlet* (Laurence Olivier, 1948) which cost £572,500 and *The Red Shoes* (Powell and Pressburger, 1948), budgeted at £505,600, both of which did well in the USA.³⁷ Films made with the IF aimed for more modest budgets of £104-105,000,

compared with the more typical £160,000 for lower budget feature films in 1949.³⁸ The average length of an IF feature however was 7,840 feet, considerably longer than the average for second features of the period.³⁹ Records of releases on the Odeon circuit, owned by Rank, confirm that some IF films were billed as first features.⁴⁰

Discussion of budgets and production methods accompanied the release of the first IF feature film, *Warning to Wantons*. Each IF release was designed to demonstrate a different aspect of the method. Scholarship has tended to group the films together as low-budget “quota fillers” aimed at working-class audiences.⁴¹ But reviewing the films shows that each was quite different, suggesting a variety of generic possibilities enabled by the IF. *Warning to Wantons* was “designed to show that lavish settings with many luxury interiors and elaborate backgrounds, are at the disposal of even a moderate priced picture.”⁴² The film cost £117,000 and was shot in six weeks. Contemporary estimates calculated that made by normal methods at either Denham or Pinewood, the film would have cost £250,000. From this perspective, “judged by present-day standards of price and production time the picture is a brilliant success.”⁴³ As a light comedy, the film follows the adventures of Renée de Vallant (Anne Vernon), a wily young woman who has escaped from her convent school. She pretends to be a young ingénue, captivating most of the men she meets including Max (David Tomlinson) the fiancé of Maria (Sonia Holm) who can see through her wiles.

The film’s location is unspecified, but it is “abroad” in a generic sense, even to the extent of having characters from a village speak an unknown language. The use of location shots is fairly abundant, with actors doubling for the film’s stars in the distance. But the film also has some quite opulent sets for a castle, ballroom, banquet, and fashion house. Even though the *Kinematograph Weekly*’s reviewer had reservations about the film’s cast and box-office potential, its “rich staging” was praised as “spectacular” and “generously mounted.”⁴⁴ The film’s non-specific “foreignness” can be related to one of Rawnsley’s aims to make IF-

developed sets and projections available to producers abroad. Rather than dub or subtitle a film for non-English speaking release, the “frame” of the film could in theory be applied with the addition of a different cast. Although this method has been criticized, in this case one can see how a film such as *Warning to Wantons* would lend itself to such transferability.⁴⁵ The idea is similar to the trend for multi-lingual versions (MLVs) of films that were popular in the early years of sound. American and European studios shot multiple versions of films in different languages and with indigenous stars, but the sets and crews were the same. The IF provided a means of rationalizing this process technically, and although there are no examples of this happening, the aim was to give the IF an international applicability in keeping with its ambitions to encourage cheaper films whose “frames” could, in effect, be recycled beyond the UK.

Warning to Wantons made use of the effects that were an integral part of the IF’s signature. Back projection was frequently used, as in an early scene in which two girls and a nun are shot on a sparse set but with a background of a colonnade vista that has been projected. Another scene featured a large castle room, with a vast pillared background and glass doorway. The actors performed on a small raised platform in the studio which was sparsely furnished with props. On the platform was a glass doorway through which the actors moved. Plastic projection screens surrounded this stage, onto which were projected photographs of the castle interiors which had been made in Portugal. In pre-planning technicians made sure that the outline of the projected castle fitted exactly with the outline of the glass doorway from the point-of-view of the camera. Also in preparation for this scene, technicians knew how to place another screen behind the glass door so that during the action the camera picked up distance location shots through the studio door.”⁴⁶ Transparencies, matte processes and live action were coordinated in the backgrounds, using shadows strategically in the frame.⁴⁷

Floodtide was set in postwar Glasgow and the Clydeside shipyards. Achieving authenticity of place and realism were important to the film's tale of David Shields (Gordon Jackson), a young man from the country who dreams of being a ship designer. His rise to the top brings conflict between his loyalty to former workmates and friends, and the very different social milieu associated with his upward career trajectory. The film did not do well at the box-office, but its location shots of Glasgow and Clydeside are remarkable for their vivid capture of postwar shipyard work and labor.⁴⁸ Indeed, the *Kinematograph Weekly*'s review referred to it as "a shrewd cross-section of life on Clydeside...Honest, down to earth and showmanlike, it's the best and most entertaining 'regional' offering screened for many a day."⁴⁹ While the IF is in evidence in some scenes (the projected backgrounds sometimes appeared less in focus than the foreground action), the interior sets were generally successful in suggesting the different class positions of their inhabitants. The film was definitely aimed to showcase how the IF combined location shots with process ones in a locale that lent itself to graphic imagery [Fig 5]. A back projection of a shipping cradle in one shot, for example, was combined with a real girder in the foreground in the studio; the actors were then filmed to complete the action. As well as being of interest technically, the film's concentration on Shields's commitment to hard work, technical ingenuity, and engineering skill, can be interpreted as a self-reflexive statement on the aims of the IF; working hard to obtain the best results was the film's message as well as its methods.



[5_Street_Fig5 here]

The next IF productions, *Stop Press Girl* and *Poet's Pub* were comedies, a genre associated with lower-budget films which could, as Chibnall and McFarlane acknowledge, provide “a laboratory for technological experimentation.”⁵⁰ Producer Donald Wilson told the trade press that “even in a moderate-priced comedy, the director need not be restricted in the number of his sets and that extensive use of process work for comedy effects need not be too expensive an item.”⁵¹ *Stop Press Girl* employed a variety of sets for its story of Jennifer Peters (Sally Ann Howe) who has the power to stop machinery. Comedy is created around this basic situation involving her stopping cars, trains, a film show, the clocks in a factory, and an aircraft.

Stop Press Girl had the advantage of many scenes taking place in confined spaces such as a railway carriage, a car, or plane. With an emphasis on dialogue and medium-close shots, less emphasis was placed on whether the IF succeeded in seamlessly “matching” different sets and locations. From many perspectives *Stop Press Girl* is perhaps the most successful of the IF films.⁵² The film’s presentation of successive comic set-ups works well, as does the escalation of public interest in Jennifer as a “miracle girl” heroine for Nature vs. Machine Age protestors. This anticipates some of the ideas in Ealing’s more famous *The Man in the White Suit* (Alexander Mackendrick, 1951), a comedy that similarly deals with issues of overdependence on technology. The formula of combining gentle comedy with larger issues thus works well, and the IF seemed on course to deliver more effective comedies such as *Poet's Pub* which also had a respectable afterlife on American television.⁵³

The next IF film, *Boys in Brown*, has received more critical commentary than the others, perhaps because of its “social problem” genre, in this case a study of the British Borstal corrective institution for young offenders.⁵⁴ Its director, Montgomery Tully, is also notable for his work in directing “B” movie crime thrillers.⁵⁵ Although the film’s ostensible

message defends the Borstal system, the film can be read as being, as Raymond Durgnat noted, “ahead of its time in criticizing the running of Borstals.”⁵⁶ To some extent this is an effect of the film’s graphic imagery, rendered stark with harsh lighting contrasts in many scenes which evoke the pervasive Borstal environment as oppressive, prison-like and depressing [Fig 6]. *Boys in Brown* follows the time spent in Borstal by Jackie Knowles (Richard Attenborough), who is depicted as a young man who has got in with the wrong crowd, and once inside the institution gets caught up in an unsuccessful escape plan. The *mise-en-scène* contributes a disturbing picture of life in Borstal where the institution grinds down the young men with drills, the cold, chapel, exercise, and work.



[5_Street_Fig6 here]

Boys in Brown was conducive to the IF technique. As Dixon has also noted: “The brown uniforms worn by the inmates readily lent themselves to easy ‘matching’ of close and distant shots, and they made substitutions between actors and stand-ins extremely easy to accomplish.”⁵⁷ Stills of the interiors of corrective institutions were projected as backdrops for several scenes [Fig 6]. Using stills in this way presented considerable technical problems, not least the buckling of slides under the heat of the projector.⁵⁸ This problem was somewhat ameliorated by water-cooling the light beam and also by air-cooling the slide.⁵⁹ While the artificiality was rather obvious, the foreground placement of the figures and action directed viewers’ attention away from the IF mechanics of the scene. In this sense, the film does not

appear inauthentic since the character-focused drama establishes the internal regime of the setting, reinforcing an impression of its emphasis on conformity and regimentation. A model was built of the interior of a Borstal since the Home Office was reluctant to sanction filming inside a real institution. Instead, the model reproduced this in replica form and was photographed for still plates from many different angles.⁶⁰

The escape scenes are lit darkly by lighting cameraman Gordon Lang, emphasizing danger. As the inmates climb over the Borstal's high outside wall the imagery of prison dramas is vividly recalled. Lang was full of praise for how using IF methods assisted the cinematography: "The most helpful aspect of the IF system was the full conference between planners, writers and senior technicians from the first stage of production."⁶¹ Yet it seems the film was not particularly popular. Gillett argues that this might have been because actors Richard Attenborough and Jimmy Hanley are "not convincing as working-class delinquents."⁶² Yet Attenborough had successfully performed such characters before, most notably in *Brighton Rock* (John Boulting, 1947). Perhaps the emphasis on Jackie being rather passive, even naive, made for a less compelling performance.

Production on *Boys in Brown* moved from Pinewood to Denham so that the next film using the IF, *The Astonished Heart*, could be produced at Pinewood.⁶³ This was a completely different type of film with a "higher class" profile because of its adaptation by Noël Coward from his own play. It starred Celia Johnson as Barbara Faber in a sort of reprise of her performance in *Brief Encounter* (David Lean, 1945), only this time with her fictional husband Christian (Noël Coward) having an affair. The film was only made in part by using the IF techniques because, according to assistant director Gerry O'Hara, "the process was too constricting."⁶⁴ It is also possible that the film's pitching as "quality drama" was thought to necessitate special treatment but whereby aspects of the IF could be beneficial. Back projection was used extensively, supervised by Charles Staffell who had worked on other IF

films. The *Kinematograph Weekly* always considered a film's likely audience in its reviews. *The Astonished Heart* was judged thus: "The acting is polished, but the characters are inclined to talk too much. Good theatre, if not ideal kinema, it, nevertheless, carries strong feminine appeal. Title and star values are, of course, exceptional. Attractive 'double bill', but for the tiara rather than the bonnet-and-shawl brigade."⁶⁵ So this was entirely different from previous IF films in terms of locale and pitch, and the film's failings can hardly be attributed solely to its technical production. Even though the comedies *Warning to Wantons*, *Stop Press Girl*, and *Poet's Pub* also featured upper middle-class characters, the tragic drama about a psychiatrist's obsession with another woman involves a very different, dark sensibility. The film failed to re-capture the melodramatic tension of *Brief Encounter*, perhaps because neither the romantic pairing of the central couple nor Barbara's angst at being betrayed by her husband created the depths of emotional intensity associated with the former film.

After *The Astonished Heart* no further films were produced with overt reference to the IF in advertising or in the trade press.⁶⁶ Rank had spent between £600,000 and £900,000 on the process, a high sum at a time when his company was in considerable financial difficulty.⁶⁷ On the other hand, Rank had spent and lost more on the production of *Bonnie Prince Charlie*, while the IF productions' budgets were considerably lower. It would only have taken one of them to be successful to represent a good return on Rank's investment. While the problems facing the film industry presented producers with a challenge to innovate, they also stymied a systematic introduction of the IF.

One way to think of the experiments of 1948-9 is that they were part of a longer trajectory of how effects were being used in studios and how change depended on lessons learned over time. Wood notes how "the new 'travelling matte' process, evolved by the Pinewood technicians, largely superseded the Back Projection part of the IF technique."⁶⁸ This is an important point because it meant that actors and backgrounds could be

photographed separately. Actors were filmed in a filtered yellow light against a blue background, and the two were married in the final print. The advantages over back projection were that the scale of the background could be enlarged and both actors and backgrounds would appear to be in sharp focus at the same time. As we have seen, back projection tended to have the effect of flattening out perspective. In addition, Salt references that the new form of travelling matte involved “a Technicolor-type beam splitter camera” invented in Britain in the early 1950s.⁶⁹ This is also referred to by Bryan Langley, a cinematographer who was involved in special effects at the time. He recalled: “Travelling matte had the great advantage compared with back projection in as much as you could shoot it now and put on the background at leisure, anywhere and any different background, if you didn’t like the background you could change it.”⁷⁰

It has thus been recognized that the IF left a valuable legacy for Pinewood as part of an incremental culture of invention and, perhaps surprisingly, for television. Rawnsley’s ideas involved collaboration with television, an environment that was conducive to the IF’s principles and practices. He advocated the re-design of studios to enable continuous production, with much preparation achieved in advance of a production by means of the “framework” as had been established at Pinewood.⁷¹ He also saw the potential of television cameras being used to assist film directors since their viewfinders permitted instant examination of what was being transmitted. The efficiency of the television studio in this respect made for quicker productions, as well as the incorporation of pre-recorded back projection and matte processes into the finished program. Rawnsley hoped that electronic techniques used in television could assist film production environments.⁷² He even speculated that eventually “the motion picture camera will be supplanted by television cameras.”⁷³ Indeed, in the 1950s some US television shows were shot live in the studio using three 35mm cameras with television cameras attached as “a sort of early video assist.” This enabled

framing and focusing through the television camera linked to the film camera, and via monitors the director could see what each camera was filming. *Stop the World I Want to Get Off* (Philip Saville, 1966), a British feature film shot at Pinewood, used a similar multi-camera system which enabled the director to plan edits in advance of rushes.⁷⁴

There were additional IF spin-off benefits for television. Donald Wilson, producer of *Under the Frozen Falls*, the first IF short film, *Warning to Wantons* and co-founder of Aquila Films, went on to a career in television production including the BBC's *The Forsyte Saga* (1967). The series was extremely popular in spite of its "artificial and cost-conscious" style in which videotaped interior shots were happily intercut with sequences that had been filmed on location. The BBC's technicians studied the IF equipment at Pinewood which in turn informed television production.⁷⁵ As Rawnsley had predicted, aspects of the IF were thus successfully employed for the "assembly line" television production environment. To facilitate back projection, John Hawkesworth, a draughtsman at Pinewood, worked on the IF's rostrums that lifted projectors located at the end of a long tunnel which had been built at the end of the stage. He later produced *Upstairs, Downstairs* (London Weekend Television, 1971-75), another British television series which achieved outstanding popular and critical success despite being made using cost-effective methods of combining location footage and studio sets.⁷⁶

The physical legacy of the IF was considerable. As early as 1951 the IF rostrums were deployed at Denham to assist 20th Century Fox's production *The House on the Square* (Roy Ward Baker). In praise of the rostrums Baker commented: "It's a joy to know that your sound isn't going to be spoiled by even one wooden creak, and you can move them without trouble."

⁷⁷ For several actors, including Gordon Jackson, Richard Attenborough, Joyce Grenfell, and Sonia Holm, as well as technicians, the IF films provided valuable training for their future careers. Ronald Spencer, assistant director on *Warning to Wantons*, went on to work with

Raoul Walsh, Edward Dmytryk, Carol Reed, Jack Clayton, and David Lean. As managing director of Pacesetter Productions, Spencer forged important production links with the Children's Film and Television Foundation.⁷⁸ Visual effects specialist Charles Staffell worked on all of the IF films and went on to do back projection for *2001: A Space Odyssey* (Stanley Kubrick, 1968). He planned and executed the effects on many other films produced at Pinewood including *Superman* (Richard Donner, 1978) and *Aliens* (James Cameron, 1986). In his view the IF was a very good system but it ran into problems because the film scripts and directors employed were not always good.⁷⁹ Another view on the IF's shortcomings was that a rigid production schedule stifled creativity on the set, and also prevented directors from devising ingenious solutions to problems as they arose during production.⁸⁰ The principles of mechanization that were at the heart of the IF were not always popular among art directors including John Bryan and Alfred Junge.⁸¹ It is worth noting, however, that Junge's earlier methods of working as a celebrated production designer in Britain resemble some of the tenets of the IF, including emphasis on pre-planning for "total design," particularly the use of continuity sketches, photographic backgrounds, and back projection.⁸²

In the final analysis, the IF's aim to support continuous production in British studios was perhaps over-ambitious, in view of the problems experienced by producers. Unlike Hollywood, where the studios' infrastructures relied on top-down, producer-driven methods which accommodated lower budget and prestige productions, British producers struggled to deliver the levels of productivity required to fully take advantage of the IF's innovations. As such the slate of films produced was very small in comparison with the total number that needed to be produced. The IF's high profile placed great emphasis on its potential at a time when there was immense pressure for the industry to deliver. Far from being similar, the films attempted to trail the IF in a number of genres, and the method proved particularly appropriate for comedies and also in conjunction with remarkable location footage. For all its emphasis

on timetables, precision, and efficiency, the IF was harbinger to an adventurous spirit of research and development at Pinewood, involving continuous experimentation with effects such as back projection and the travelling matte process.⁸³ As we have seen, Rawnsley also had the foresight to see that television studios had much to offer film studio environments and technologies. With these and other considerations, even though the IF experiment lasted only a few years, in the longer-term it contributed to the establishment of a robust technical infrastructure at Pinewood which laid the foundations for the studio's subsequent outstanding reputation for technical excellence as well as streamlined methods of production.

¹ Darrel Catling, "The Independent Frame," *Supplement to Film Industry* 4, no. 20 (February 1948): 13.

² See Edward Carrick, "The Pictured Script," *Kinematograph Weekly Studio Review* 26, (January 1950): 29, 31 for a discussion of how graphic art was incorporated into filmmaking.

³ Michael Powell to Rank, Feb 1945, quoted by Geoffrey Macnab, *J. Arthur Rank and the British Film Industry*. London: Routledge, 1993), 122.

⁴ The most extensive commentary is provided by Wheeler Winston Dixon, "The Doubled Image: Montgomery Tully's *Boys in Brown* and the Independent Frame Process," in *Re-Viewing British Cinema: Essays and Interviews*, ed. Wheeler Winston Dixon, (New York: SUNY, 1994), 41-52. See also Alan Wood, *Mr Rank: A Study of J. Arthur Rank and British Films* (London: Hodden and Stoughton, 1952), 180-84 and Macnab, *J. Arthur Rank and the British Film Industry*, *Ibid.*, 122-131.

⁵ G.R. Stevens, "Independent Frame – An Attempt at Rationalization of Motion Pictures," *Journal of the Society of Motion Picture Engineers* 57 (November 1951): 434-45.

⁶ Michael Powell, *Million-Dollar Movie* (London: Heinemann, 1992), 79.

⁷ *Ibid.*

⁸ Wheeler Winston Dixon, *Re-Viewing British Cinema*, 49.

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- ⁹ Macnab, *J. Arthur Rank and the British Film Industry*, 126.
- ¹⁰ Harold Huth, "Rawnsley Was Right But...", *Film Industry* 6, no. 40 (27 January 1949): 5.
- ¹¹ Catling, *Supplement to Film Industry*, February 1948, 19-20.
- ¹² *Kinematograph Weekly* 383, no. 2175 (6 January 1949): 6.
- ¹³ *Ibid.*, 8.
- ¹⁴ Laurie Ede, *British Film Design* (London: I.B. Tauris, 2010), 70. For descriptions with photographs see Anon, "Equipment for 'Independent Frame' Filming," *The Engineer* 118, no. 2 (26 August 1949): 222-25.
- ¹⁵ Rawnsley was Head of Rank's Research Department 1945-49.
- ¹⁶ *Boys in Brown* began production at Pinewood but completed at Denham as reported in *Film Industry* 6, no. 50 (16 June 1949): 10.
- ¹⁷ Kenneth Bellman became managing director of the sponsoring company when Rawnsley left Rank, as noted in the *Kinematograph Year Book* (London: Odhams Press, 1950), 165.
- ¹⁸ The value of the commodity (film) for the calculation of the duty was one quarter of its gross value. The duty was then set at three times its dutiable value.
- ¹⁹ The quota was a controversial topic, with different interests in the film trade lobbying for lesser (exhibitors) or greater (producers) degrees of state protection. The quota was reduced to 30% in 1950. See Margaret Dickinson and Sarah Street, *Cinema and State: The Film Industry and the British Government, 1927-84* (London: British Film Institute, 1985), 195-98.
- ²⁰ Production survey by P.G. Baker, *Kinematograph Year Book* (London: Odhams Press, 1949), 152.
- ²¹ *Kinematograph Year Book*, 1949, 156. Italics in original.
- ²² *Ibid.*, 151.
- ²³ Production survey by P.G. Baker, *Kinematograph Year Book*, 1950, 153.

²⁴ R. Howard Cricks, "Technical Developments in 1949," *Kinematograph Year Book*, 1950, 165.

²⁵ Ibid.

²⁶ Stevens, "Independent Frame," *JSMPE*, November 1951, 436.

²⁷ Wood, *Mr Rank*, 181-82.

²⁸ This was exploited to great effect by cinematographer Ossie Morris in *Moulin Rouge* (John Huston, 1952). See interview with Morris in Simon Brown, Sarah Street and Liz Watkins, *British Colour Cinema: Practices and Theories* (London: British Film Institute/Palgrave Macmillan, 2013), 77.

²⁹ Donald Wilson, "How the Independent Frame is working out in practice," *Studio Review Supplement*, *Kinematograph Weekly* 386, no. 2191 (28 April 1949) 39.

³⁰ *Film Industry* 5, no. 35 (18 November 1948): 1; *Film Industry* 5, no. 37 (16 December 1948): 1; *Film Industry* 5, no. 38 (30 December 1948): 1.

³¹ Terence Verity, "Turntable Technique for Space-Saving Sets," *Film Industry* 6, no. 40 (27 January 1949): 10.

³² Kenneth K. Rick, "Pre-planning and the smaller studio," *Film Industry* 6, no. 50 (16 June 1949): 10.

³³ David Rawnsley, "Indirect Lighting," *Film Industry* 6, no. 43 (10 March 1949): 10.

³⁴ Dickinson and Street, *Cinema and State*, 205.

³⁵ Sarah Street, *Transatlantic Crossings: British Feature Films in the USA* (New York: Continuum, 2002), 94.

³⁶ Figures quoted from Board of Trade records by Sue Harper and Vincent Porter, *British Cinema of the 1950s: The Decline of Deference* (Oxford: Oxford University Press, 2003), 275.

³⁷ Ibid. For details of the distribution and reception of *Hamlet* and *The Red Shoes* in the USA see Street, *Transatlantic Crossings*, 106-110.

³⁸ *Kinematograph Weekly* 386, no. 2188 (7 April 1949): 3. “Supporting Features” generally tended to have even smaller budgets and lengths, as noted by Stephen Chibnall and Brian McFarlane, *The British ‘B’ Film* (London: British Film Institute/Palgrave Macmillan, 2009), 40.

³⁹ Figures compiled from the *Kinematograph Year Book*, 1950, 7-35.

⁴⁰ See lists of Odeon releases in Allen Eyles, *Odeon Cinemas 2: From J. Arthur Rank to the Multiplex* (London: British Film Institute, 2005), 199-200.

⁴¹ Dixon, *Re-Viewing British Cinema*, 50. See also George Perry, *Movies from the Mansion: A History of Pinewood Studios* (London: Pavilion Books, 1986), 78.

⁴² *Kinematograph Weekly* 386, no. 2191 (28 April 1949): 39.

⁴³ John Sullivan, “Rawnsley was right,” *Film Industry* 6, no. 39 (13 January 1949): 7.

⁴⁴ *Kinematograph Weekly* 383, no. 2175 (6 January 1949): 16.

⁴⁵ Dixon’s *Re-Viewing British Cinema*, 43, refers to this as “a metaphoric packing crate” but assumes that the locations in the films were all shot in the UK. *Warning to Wantons* however contains several foreign location shots, probably of the Riviera.

⁴⁶ David Rawnsley, “The first Independent Frame feature film comes to the screen,” *Kinematograph Weekly* 383, no. 2175 (6 January 1949): 8.

⁴⁷ Stevens, “Independent Frame,” *JSMPE*, November 1951, 437.

⁴⁸ This has also been noted by Philip Gillett, *The British Working Class in Postwar Film* (Manchester: Manchester University Press, 2003), 100, 202, 203

⁴⁹ *Kinematograph Weekly* 385, no. 2185 (17 March 1949) 17.

⁵⁰ Chibnall and McFarlane, *The British ‘B’*, 72.

⁵¹ Studio Review Supplement, *Kinematograph Weekly* 386, no. 2191 (28 April 1949): 39.

⁵² Although Perry describes it as “a disaster, a misfired comedy savaged by the critics and ignored by the public,” in *Movies from the Mansion: A History of Pinewood Studios*, 78. The *Kinematograph Weekly*’s review was critical of Sally Ann Howes’ performance, describing the film as a “crazy comedy...mediocre light booking,” *Kinematograph Weekly* 387, no. 2195 (26 May 1949): 18.

⁵³ For contemporary reviews see Chibnall and McFarlane, *The British ‘B’ Film*, 72-3. *Stop Press Girl* is reported as being shown on American television, especially before the 1970s: <https://www.lovingtheclassics.com/by-title/s/stop-press-girl-1949.html>, accessed 21 May 2017. William K. Everson reviewed *Poet’s Pub* in October 1979 where he records that it was part of a TV package. He comments: “Although *Poet’s Pub* wasn’t a blockbuster in England and certainly wouldn’t have been one here either, it was nevertheless quite superior to a number of lesser Rank comedies (*Marry Me*, *The Perfect Woman*) which somehow did get US exhibition.” See reprint of Everson’s Program Notes for the New School for Social Research in *Film History* 15, no. 3 (2003): 347.

⁵⁴ Dixon writes about the film in “The Doubled Image,” 44-51.

⁵⁵ Chibnall and McFarlane, *The British ‘B’ Film*, 145.

⁵⁶ Raymond Durgnat, *A Mirror for England: British Movies from Austerity to Affluence* (London: Faber and Faber, 1970; 3rd edition, BFI/Palgrave Macmillan, 2011), 60.

⁵⁷ Dixon, “The Doubled Image,” 44.

⁵⁸ This point is made by art director L.P. Williams, 12 August 1993, BECTU History Project, Interview no. 381.

⁵⁹ *Kinematograph Year Book* 1950, 165.

⁶⁰ Brian Robins, “Full Production at Pinewood Again,” *Film Industry* 6, no. 47 (5 May 1949): 4.

⁶¹ Ibid.

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- ⁶² Gillett, *The British Working Class in Postwar Film*, 132.
- ⁶³ *Kinematograph Weekly*, 9 June 1949, 17.
- ⁶⁴ Interview with Gerry O'Hara by Wheeler Winston Dixon, 3 December 2010:
<http://www.screeningthepast.com/2011/04/working-within-the-system-an-interview-with-gerry-o'hara/>, accessed 21 May 2017.
- ⁶⁵ *Kinematograph Weekly*, 9 February 1950, 16.
- ⁶⁶ Rawnsley left film production and emigrated to Italy. Ede, *British Film Design*, 71.
- ⁶⁷ Most sources say Rank spent £600,000 on developing the IF but Laurie Ede has a higher figure of £900,000, quoted in *British Film Design* (London: I.B. Tauris, 2010), 71 and this figure is also quoted by Harper and Porter in *British Cinema of the 1950s*, 201.
- ⁶⁸ Wood, *Mr Rank*, 183.
- ⁶⁹ Barry Salt, *Film Style and Technology: History & Analysis* (London: Starwood, 1983), 321.
- ⁷⁰ Bryan Langley: BECTU Interview Part 1 (1987). Accessible on the British Entertainment History project website: <https://historyproject.org.uk/interview/bryan-langley>, accessed May 19, 2019.
- ⁷¹ David Rawnsley, "Television Film Production by the Independent Frame," *Film Industry*, 21 October 1948: 6-7, 18.
- ⁷² Stevens, "Independent Frame," *JSMPE*, November 1951, 442.
- ⁷³ Rawnsley, "Television Film Production by the Independent Frame," 7.
- ⁷⁴ David Cleveland and Brian Pritchard, *How Films Were Made and Shown* (Manningtree, Essex, 2015), 339.
- ⁷⁵ Wood, *Mr Rank*, 183-84.
- ⁷⁶ Langley, BECTU Interview.
- ⁷⁷ *Kinematograph Weekly* 408, no. 2280 (8 March 1951): 38.

⁷⁸ Derek Threadgall, *Shepperton Studios: An Independent View* (London: British Film Institute, 1994), 102.

⁷⁹ Staffell quoted in Macnab, *J. Arthur Rank and the British Film Industry*, 130.

⁸⁰ Langley, BECTU Interview.

⁸¹ Ede, *British Film Design*, 70.

⁸² Tim Bergfelder, Sue Harris and Sarah Street, *Film Architecture and the Transnational Imagination: Set Design in 1930s European Cinema* (Amsterdam: Amsterdam University Press, 2007), 86.

⁸³ *Kinematograph Weekly* 401, no. 2257 (3 August 1950): 30.